

**WHAT IS CLAIMED IS:**

1. A method for determining properties of a sample surface using an atomic force microscope, comprising:

5       applying a first voltage between the sample and a probe;

          moving the probe towards the surface of the sample;

          stopping movement of the probe towards the surface of the sample when current in the probe is initially detected;

10       and

          applying a magnetic field to the probe such that the probe obtains stable contact with the surface of the sample.

15       2. The method of claim 1, wherein the magnetic field is applied by a magnetic coil.

3. The method of claim 1, wherein the probe is moved towards the sample by a piezoelectric scanner.

20       4. The method of claim 1, further comprising:  
          converting the current in the probe to a second voltage.

5. The method of claim 4, further comprising:

amplifying the second voltage; and  
generating an image representative of a sample surface  
property based on the amplified second voltage.

5           6.    The method of claim 1, wherein the magnetic field  
is applied to the probe after the movement of the probe  
towards the sample surface is stopped.

10           7.    The method of claim 1, further comprising:  
oscillating the magnetic field applied to the probe.

15           8.    The method of claim 7, wherein the probe is  
oscillated with an amplitude of 200 Oe and a frequency of 5  
Hz for a duration of 2 cycles.

            9.    An atomic force microscope that determines  
characteristics of a surface of a specimen, comprising:

            means for applying a first voltage between the sample  
and the probe;

20           means for moving the probe towards the surface of the  
sample;

            means for stopping movement of the probe towards the  
surface of the sample when current in the probe is initially  
detected; and

means for applying a magnetic field to the probe such that the probe obtains stable contact with the surface of the sample.

5           10. The atomic force microscope of claim 9, wherein the means for applying a magnetic field is a magnetic coil.

10           11. The atomic force microscope of claim 9, wherein the means for moving the probe towards the sample is a piezoelectric scanner.

12. The atomic force microscope of claim 9, further comprising:

15           means for converting the current in the probe to a second voltage.

13. The atomic force microscope of claim 12, further comprising:

20           means for amplifying the second voltage; and  
          means for generating an image representative of a sample surface property based on the amplified second voltage.

14. The atomic force microscope of claim 9, wherein the means for applying a magnetic field applies a magnetic field to the probe after the means for stopping movement of the probe stops movement of the probe towards the sample surface.

15. The atomic force microscope of claim 9, further comprising:

means for oscillating the magnetic field applied to the probe.

16. The atomic force microscope of claim 15, wherein the means for oscillating the probe oscillates the probe with an amplitude of 200 Oe and a frequency of 5 Hz for a duration of 2 cycles.

17. The atomic force microscope of claim 9, further comprising a means for supporting the sample, the means for applying a magnetic field being disposed on the means for supporting the sample.